



DATE: November 19, 2007

TO: Rajeshmal Singhvi, EPA Work Assignment Manager

THROUGH: Dennis Miller, REAC Program Manager *[Signature]*

FROM: Martin Ebel, REAC Task Leader

SUBJECT: Multi-Media Sampling - Tidewater Bailing Site
Work Assignment 0-292 Trip Report

PURPOSE

The investigation, conducted on November 1, 2007, was to collect multimedia samples (soil, turf, mat, residue, dust) for lead (Pb) and/or polychlorinated biphenyl (PCB) analyses to determine the source or sources of contamination at the site. Soil samples were collected from the baseball infield and from the perimeter of the field and analyzed for lead and PCBs to confirm the results found by previous investigations at the site. Multimedia samples were collected from areas covered with artificial turf. These samples included soil material present on the turf collected through vacuum sampling, the turf and the two mat layers beneath the turf and residue from between the turf and the top mat. These materials were analyzed for lead. All work was carried out by Lockheed Martin Response Engineering and Analytical Contract (REAC) personnel under the technical direction of the Environmental Protection Agency/Environmental Response Team (EPA/ERT).

BACKGROUND

The Tidewater Bailing site is a known contaminated site immediately north of the ballfield. The ball field covers approximately 2.5 acres and is located in a mixed residential and commercial area of Newark, Essex County, New Jersey. A soccer field and baseball field are on the site and are covered with artificial turf that overlies an older ball field. Nearly the entire site is covered either by the artificial turf or asphalt in the parking lots. The only exposed soil is in the baseball infield and along the perimeter.

Tidewater Bailing (Tidewater) began operating at its site in 1945, processing and recycling a variety of scrap metal. It is not known when operations ceased, but reportedly the ball field may have been impacted. A site investigation by the New Jersey School Construction Corporation was completed in 2003 to evaluate the Tidewater property for a new public high school. Samples collected from test pits and borings indicated elevated levels of heavy metals, PCBs, and petroleum hydrocarbons in site soil. Lead concentrations were as high as 32,000 milligrams/kilogram (mg/kg) at depths of less than one foot. Further investigations under the direction of EPA in April 2007 continued to show high lead concentrations, up to 3,790 mg/kg in six soil samples collected near Charles Street to the west. Other contaminants included copper, zinc, and PCBs. The New Jersey Department of Health and Senior Services collected vacuum, wipe, turf and soil samples from the athletic field. Their highest concentration reported was 3,500 mg/kg a in turf sample.

METHODS

X-Ray Fluorescence Measurements

A hand-held field portable X-Ray Fluorescence (XRF) instrument was used to screen for lead on soil and turf surfaces. Samples were analyzed in-situ to identify sample locations. Quality control (QC) and detection limit samples were run

at the REAC laboratory prior to site deployment. A final detection limit and precision QC sample was run on-site at the conclusion of XRF sample measurements. In-situ measurements were collected for lead using a 60-second exposure time and a Niton in-situ adaptor. The XRF measurements were made in accordance with SOP 1720 - *Operation Of The Niton XLt792YW Field Portable X-Ray Fluorescence Instrument*. Site soil was screened at 18 locations both around the perimeter of the site and in the baseball infield. Artificial turf surface measurements were collected at 21 locations (Figure 1). Examination of the spectra indicated that Pb was present.

Soil Sampling

Eighteen surface soil samples and a duplicate were collected during the investigation. Soil was collected from each of the five infield areas, both dugouts, and from along the perimeter as indicated on Figure 1. The soil samples were submitted for lead and PCB analysis. The soil samples were collected with disposal scoops and placed directly into glass jars for transport to the laboratory. Green fibers from the artificial turf were noticeable throughout the site soil, so when possible, these fibers were excluded from the sample.

Artificial Turf Sampling

At five locations where artificial turf covers the field, multiple samples were collected. Dust samples were collected first using a Nilfisk GS-80 vacuum cleaner in accordance with SOP 2040 - *Collection Of Indoor Dust Samples From Carpeted Surfaces For Chemical Analysis Using A Nilfisk GS-80 Vacuum Cleaner*. The area selected for sampling was centered on the selected XRF measurement location with a size determined by professional experience in assessing the amount of material on the surface. The artificial turf was fairly clean, so relatively large areas were sampled; 169 square feet at 4 locations and 84.5 square feet at the fifth location. Locations near the edge of the artificial turf were rectangular rather than square to keep the areas centered on the location of the other samples and to exclude soil areas from the vacuuming.

After an area was vacuumed, samples associated with the artificial turf were collected. Three layers (i.e. turf, mat 1, and mat 2) were successively cut for sample collection. The turf is the actual playing surface of the field and has small green grass-like fibers to mimic grass. Beneath the turf is a rubbery mat (mat 1), and below that is another rubber-like mat (mat 2), both of which were sampled. The top mat is black and relatively homogenous, while the bottom mat, also black, had gravel-like material impregnated into the material. Below the second mat was a layer of angular gravel thick enough to preclude the proposed soil sampling from beneath the turf. Two of the selected locations had sufficient fine-grained material below the turf and above the first mat for sampling. These samples were designated residue samples and were analyzed for lead.

RESULTS

Soil

The analytical results for the soil samples are presented in Table 1 and the analytical report in Appendix A. The XRF measurements are also reported along with an uncertainty value. The estimated detection limit for XRF is approximately 50 to 60 mg/kg. The lead concentrations range from 4.10 mg/kg for the duplicate sample identified as 2TB to 29.7 mg/kg. These concentrations are less than the values measured with the field XRF instrument and well below the New Jersey Department of Environmental Protection's Residential Direct-Contact Soil Cleanup Criteria (NJDEP RDCSCC) of 400 mg/kg. PCB as Aroclor 1260 was detected in only two samples at estimated concentrations well below the reporting limit and the NJDEP RDCSCC of 0.49 mg/kg. These two samples were collected on the northern perimeter where the ballfield is adjacent to the Tidewater Bailing site.

Artificial Turf Materials

The analytical results for the materials associated with the artificial turf are presented in Table 2. The artificial turf was analyzed as two separate samples, the turf with the backing (whole sample) and the turf fibers. The lead concentrations ranged from below the detection limit in the lower mat (Mat 2) at 17T, to 4,950 mg/kg in the turf fibers at 16T. The two

layers of the mat (Mat 1 and Mat 2) had concentrations well below the NJDEP RDCSCC for lead. The two residue samples had higher concentrations, but they are also below the cleanup criteria. The lead concentrations in the whole turf samples, ranging from 3,730 to 4020 mg/kg, are lower than those in just the fiber, ranging from 4,330 to 4,950 mg/kg. These concentrations exceed the NJDEP RDCSCC. The residue samples were composited and analyzed for PCBs with the dust sample collected at location 21T. The composite sample and dust sample contained weathered Aroclor 1016 with estimated concentrations of 0.0264 and 0.0231 mg/kg, respectively and Aroclor 1260 estimated concentrations of 0.0590 and 0.0224 mg/kg, respectively.

The analytical results for the dust sample analysis are presented in Table 3. The sample collected at location 16T with 2,290 mg/kg of lead, had the highest concentration in the analyzed portion of the sample, which excludes particles above 150 micrometers. Vacuum dust sample loading results are presented in Table 4. Sample 21-T had the highest amount of dust loading; samples 21-T and 7-T had nearly the same amount of lead loading even though sample 7-T had only about one third the dust loading as sample 21-T.

CONCLUSIONS

Six different types of samples were analyzed from the site, including soil, dust, turf, turf fibers, residue, top mat, and bottom mat. Of these samples, only the turf and turf fibers had concentrations that exceeded the cleanup criteria. Because the turf fibers are subjected to the physical impacts, such as abrasion during normal use of the field, and turf fibers were observed in the soil, the fibers could be the source of lead in the other samples. The lead concentrations in the fibers are two orders of magnitude greater than in the other samples, and when mixed with other material such as soil may contribute some, if not all, of the lead contamination.

TABLE 1
SOIL ANALYTICAL RESULTS
TIDEWATER BAILING
NEWARK, NEW JERSEY

Location	Sample ID	XRF Lead* mg/kg	Lead** mg/kg	PCB mg/kg
4P	42687	73±20	9.80 J-	U
5P	42688	U	7.34 J-	U
6P	42665	65±17	22.3 J-	0.0406 J
7P	42666	46±17	29.7 J-	0.0266 J
1D	42667	33±13	14.0 J-	U
2D	42668	42±14	12.0 J-	U
3D	42685	39±14	8.87 J-	U
4D	42686	41±14	15.3 J-	U
1PM	42672	28±14	5.24	U
2PM	42673	24±13	5.38	U
1HP	42674	22±12	6.58	U
2HP	42675	26±13	6.68	U
1FB	42676	40±14	13.0	U
2FB	42677	23±12	6.13	U
1SB	42678	26±12	6.06	U
2SB	42679	21±9	10.5	U
1TB	42671	32±13	8.22	U
2TB	42669	22±13	4.18	U
2TBD	42670	22±13	4.10	U

* Field measurement ** Laboratory results

U denotes not detected

J denotes estimated below reporting limits

J- Estimated low

New Jersey Department of Environmental Protection

Residential Direct-Contact Soil Cleanup Criteria

for lead is 400 mg/kg and for PCB is 0.49 mg/kg

TABLE 2
TURF MATERIALS ANALYTICAL RESULTS
TIDEWATER BAILING
NEWARK, NEW JERSEY

Location	Sample ID	Material	Lead mg/kg
7T	NA	Surface via XRF	3468±79
	42661	Turf - Whole	3730
	42661	Turf - Fibers	4920
	42699	Mat 1	3.55
	42700	Mat 2	25.1
16T	NA	Surface via XRF	3162±74
	42659	Turf - Whole	4020
	42659	Turf - Fibers	4950
	42693	Mat 1	16.3
	42693	Mat 1 DUP	14.8
	42694	Mat 2	5.09
17T	NA	Surface via XRF	3228±78
	42689	Turf - Whole	3990
	42689	Turf - Whole DUP	3860
	42689	Turf - Fibers	4580
	42689	Turf - Fibers DUP	4330
	42684	Residue	196 J+
	42690	Mat 1	7.06
	42691	Mat 2	U
19T	NA	Surface via XRF	3446±85
	42683	Turf - Whole	3940
	42683	Turf - Fibers	4850
	42680	Residue	270 J+
	42682	Mat 1	5.97
	42681	Mat 2	4.51
21T	NA	Surface via XRF	3316±76
	42695	Turf - Whole	3960
	42695	Turf - Fibers	4900
	42696	Mat 1	14.2
	42697	Mat 2	4.76

* Field measurement

J+ Estimated high

New Jersey Department of Environmental Protection
Residential Direct-Contact Soil Cleanup Criteria
for lead is 400 mg/kg

TABLE 3
DUST ANALYTICAL RESULTS
TIDEWATER BAILING
NEWARK, NEW JERSEY

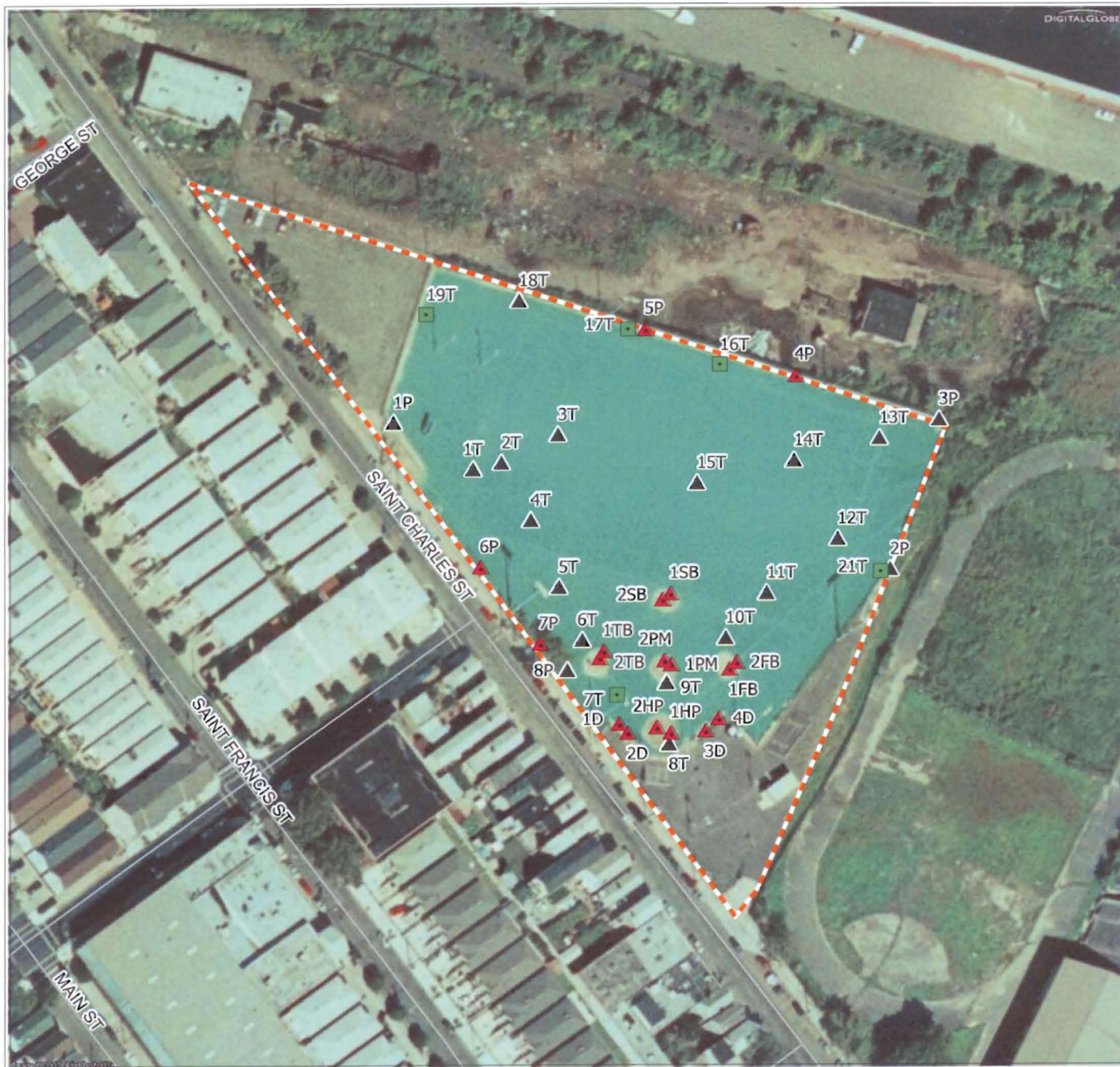
Location	Sample ID	Area Sampled ft ²	Total Weight g	Sieved Weight g	Lead ¹ mg/kg
7T	42661	169	324.91	4.02	1340
16T	42659	169	318.73	4.25	2290
17T	42657	84.5	51.70	12.86	1410
19T	42658	169	1125.80	145.42	1130
21T	42660	169	362.12	24.62	230

¹reflects concentration in particles smaller than 150 µm

TABLE 4
VACUUM DUST LOADING RESULTS
TIDEWATER BAILING
NEWARK, NEW JERSEY

Sample Location	Area (m2)	Area (ft2)	Total Dust Wt (gms)	Dust Loading/ft2 (gms)	Sieved Wt (gms)	Lead (mg/kg)	Total mg lead-sieved sample	Lead (mg/ft2)*	Lead (ug/ft2)*
17-T	7.84	84.4	324.91	3.85	4.02	1410	5.67	0.0672	67.2
19-T	15.7	169	318.73	1.89	4.25	1130	4.80	0.0284	28.4
16-T	15.7	169	51.70	0.31	12.86	2290	29.4	0.174	174
21-T	15.7	169	1125.80	6.66	145.42	230	33.4	0.198	198
7-T	15.7	169	362.12	2.14	24.62	1340	33.0	0.195	195
							Avg mg/ft2 of lead	0.133	133

* = Respirable Lead



Legend

Location Type

▲ XRF

▲ Soil

■ Turf

— Roads

--- Site Boundary



100 50 0 100 200
Feet

Map created using digital globe (quickbird) satellite imagery (2006).

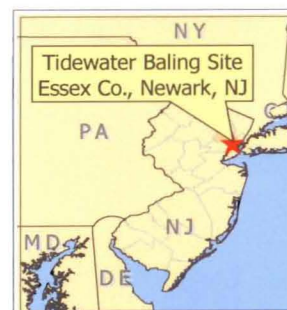
Map Creation Date: 16November2007

Coordinate system: New Jersey State Plane

FIPS: 2900

Datum: NAD83

Units: Feet



Data: g:\arcviewprojects\reac4\00-292
MXD file: g:\arcinfo\projects\reac4\EAC00292_Tidewater\292_sitemap_f1rev002
Revision Number: 002

U.S. EPA Environmental Response Team
Response Engineering and Analytical Contract
EP-C-04-032
W.A.# 0-292

Figure 1
Site Location Map
Tidewater Baling
Newark, NJ
November 2007 Investigation

APPENDIX A
ANALYTICAL REPORT
TIDEWATER BAILING SITE
NEWARK, NEW YORK

Lockheed Martin Technology Services
Environmental Services REAC
2890 Woodbridge Avenue Building 209 Annex
Edison, NJ 08837-3679
Telephone 732-321-4200 Facsimile 732-494-4021



DATE: November 26, 2007
TO: R. Singhvi, EPA/ERT Work Assignment Manager
FROM: V. Kansal, REAC Analytical Section Leader *Vinod Kansal*
SUBJECT: DOCUMENT TRANSMITTAL UNDER WORK ASSIGNMENT # 0-292

Attached please find the following document prepared under this work assignment:

Tidewater Bailing Site Ball Field - Analytical Report

R. Singhvi	Work Assignment Manager (w/o attachment)
M. Ebel	Task Leader (w/o attachment)
J. Soroka	Data Validation and Report Writing Group Leader w/o attachment)
Central File WA # 0-292	(w/attachment)

ANALYTICAL REPORT

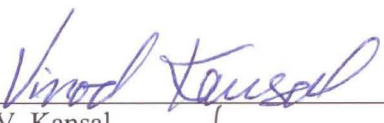

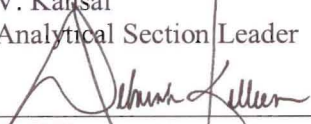
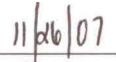
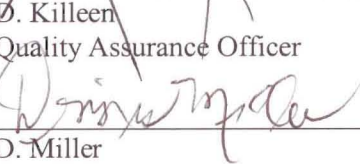
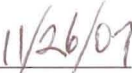
Prepared by
LOCKHEED MARTIN, Inc.

Tidewater Bailing Site Ball Field
Newark New Jersey

November 2007

EPA Work Assignment No. 0-292
LOCKHEED MARTIN Work Order EAC00292
EPA Contract No. EP-C-04-032

Submitted to
R. Singhvi
EPA-ERT

	
V. Kansal	Date
Analytical Section Leader	
	
D. Killeen	Date
Quality Assurance Officer	
	
D. Miller	Date
Program Manager	

Analysis by:
REAC

Prepared by:
Y. Mehra

Reviewed by:
J. Soroka

Table of Contents

Topic

Introduction
Case Narrative
Summary of Abbreviations

Section I

Results of the Analysis for PCBs in Soil	Table 1.1
Results of the Analysis for Lead in Dust	Table 1.2
Results of the Analysis for Lead in Soil	Table 1.3
Results of the Analysis for Lead in Mat and Residue	Table 1.4
Results of the Analysis for Lead in Turf and Fibers	Table 1.5

Section II

Results of the MS/MSD Analysis for PCBs in Soil	Table 2.1
Results of the MS/MSD Analysis for Lead in Dust	Table 2.2
Results of the MS/MSD Analysis for Lead in Soil	Table 2.3
Results of the MS/MSD Analysis for Lead in Mat	Table 2.4
Results of the MS/MSD Analysis for Lead in Residue	Table 2.5
Results of the MS/MSD Analysis for Lead in Turf	Table 2.6
Results of the MS/MSD Analysis for Lead in Turf Fibers	Table 2.7
Results of the LCS Analysis for PCBs in Soil	Table 2.8
Results of the LCS Analysis for Lead in Dust	Table 2.9
Results of the LCS Analysis for Lead in Soil	Table 2.10
Results of the LCS/LCSD Analysis for Lead in Turf and Fibers	Table 2.11
Results of the Duplicate Analysis for Lead in Turf and Fibers	Table 2.12

Section III

Chains of Custody

Appendices

Appendix A Data for PCBs in Soil	S 331
Appendix B Data for Lead in Dust	S 322
Appendix C Data for Lead in Soil	S 319
Appendix D Data for Lead in Mat and Residue	S 336
Appendix E Data for Lead in Turf and Fibers	S 341
Appendix F Data for PCBs in Soil	S 343

Appendices will be furnished on request

Introduction

REAC, in response to WA#-292, provided analytical support for environmental samples collected from the Tidewater Bailing Site Ball Field in Newark, NJ as described in the following table. The support also included QA/QC, data review and preparation of an analytical report containing analytical and QA/QC results.

The samples were treated with procedures consistent with those specified in REAC SOP #1008.

COC #	Number of Samples	Sampling Date	Date Received	Matrix	Analysis/ Method	Laboratory	Data Package	
292-11/02/07-0002	19	11/01/07	11/05/07	Soil	PCB/REAC SOP 1801	REAC	S 331	
	19				Lead/REAC SOP 1811		S 319	
292-11/06/07-0004	5	11/01/07	11/06/07	Dust			S 322	
292-11/02/07-0003	2			Residue				S 336
	10			Mat				S 341
	5			Turf				
40591	2					11/14/07	Soil	PCB/REAC SOP 1801

¹ REAC is NELAP certified for PCB and lead analyses.

Case Narrative

The laboratory reported the data to three significant figures. Any other representation of the data is the responsibility of the user. All data validation flags have been inserted into the results tables. At the request of the WAM, samples were analyzed for lead only.

PCBs in Soil Package S 331

The data package was examined and found to be acceptable.

Lead in Soil Package S 319

Lead was below the % recovery (%R) criterion for the MS of sample 42666. Lead is qualified estimated low (J-) for samples 42665 thru 42668 and 42685 thru 42688.

Lead in Dust Package S 322

The data package was examined and found to be acceptable.

Lead in Mat and Residue Package S 336

Lead was above the % R criterion for the MS/MSD of sample 42684. Lead is qualified estimated high (J+) for samples 42680 and 42684.

Lead in Turf Package S 341

At the request of the Work Assignment Manager, the turf samples were washed with distilled water four times to remove any dirt or debris, air dried for 24 hours and dried in an oven at 50 degrees C for 10 hours prior to sample digestion. The samples identified as "Turf" were prepared using the entire sample including the turf fibers and the backing. The samples identified as "Fiber" were prepared using only fibers from each sample.

The data package was examined and found to be acceptable.

PCB in Soil Package S 343

Sample 1923 is a composite of samples 42680 and 42684 from chain of custody record #2920110207-0003.

Samples 1923 and 42660 exceeded the 14 day holding time criterion for PCB extraction. The WAM requested analysis for PCBs from these samples despite the holding time. The results in these samples are qualified estimated (J).

Summary of Abbreviations

BFB	Bromofluorobenzene
C	Centigrade
CLP	Contract Laboratory Program
COC	Chain of Custody
conc	concentration
cont	continued
CRDL	Contract Required Detection Limit
CRQL	Contract Required Quantitation Limit
D	(Surrogate Table) value is from a diluted sample and was not calculated
Dioxin	denotes Polychlorinated dibenzo-p-dioxins (PCDD) and Polychlorinated dibenzofurans (PCDF)
DFTPP	Decafluorotriphenylphosphine
EMPC	Estimated maximum possible concentration
GC/MS	Gas Chromatography/ Mass Spectrometry
IS	Internal Standard
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MS (BS)	Matrix Spike (Blank Spike)
MSD (BSD)	Matrix Spike Duplicate (Blank Spike Duplicate)
MW	Molecular Weight
NA	Not Applicable or Not Available
NC	Not Calculated
NR	Not Requested
NS	Not Spiked
% D	Percent Difference
% REC	Percent Recovery
SOP	Standard Operating Procedure
ppbv	parts per billion volume
ppm	parts per million
pptv	parts per trillion volume
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
QL	Quantitation Limit
REAC	Response Engineering and Analytical Contract
RL	Reporting Limit
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
SIM	Selected Ion Monitoring
Sur	Surrogate
TIC	Tentatively Identified Compound
TCLP	Toxic Characteristics Leaching Procedure
VOC	Volatile Organic Compounds
*	Value exceeds the acceptable QC limits.

m ³	cubic meter	g	gram	kg	kilogram	L	liter
µg	microgram	µL	microliter	mg	milligram	ml	milliliter
ng	nanogram	pg	picrogram				

Data Validation Flags

J	Value or Reporting limit is estimated
J+	Value is estimated high (Metals only)
J-	Value is estimated low (Metals only)
R	Value is unusable
U	Not detected
UJ	Not detected and reporting limit estimated

Rev. 11/20/06

Table 1.1 Results of the Analysis for PCBs in Soil
WA# 0-292 Tidewater Bailing Site Ball Field
Results Based on Dry Weight

Method REAC SOP 1801

Page 1 of 3

Sample Number	SBLK110507		42669		42665		42673		42672	
Location	-		2TB		6P		2PM		1PM	
Percent Solids	100		95		96		91		92	
Analyte	Result. µg/kg	RL µg/kg	Result. µg/kg	RL µg/kg	Result. µg/kg	RL µg/kg	Result. µg/kg	RL µg/kg	Result. µg/kg	RL µg/kg
Aroclor 1016	U	41.7	U	43.9	U	43.4	U	45.8	U	45.3
Aroclor 1221	U	83.3	U	87.7	U	86.8	U	91.6	U	90.6
Aroclor 1232	U	41.7	U	43.9	U	43.4	U	45.8	U	45.3
Aroclor 1242	U	41.7	U	43.9	U	43.4	U	45.8	U	45.3
Aroclor 1248	U	41.7	U	43.9	U	43.4	U	45.8	U	45.3
Aroclor 1254	U	41.7	U	43.9	U	43.4	U	45.8	U	45.3
Aroclor 1260	U	41.7	U	43.9	40.6	J 43.4	U	45.8	U	45.3
Aroclor 1268	U	41.7	U	43.9	U	43.4	U	45.8	U	45.3

Table 1.1 (cont) Results of the Analysis for PCBs in Soil
WA# 0-292 Tidewater Bailing Site Ball Field
Results Based on Dry Weight

Method REAC SOP 1801

Sample Number	42671		42670		42674		42668		42667	
Location	1TB		2TBD		1HP		2D		1D	
Percent Solids	94		94		90		97		98	
Analyte	Result. µg/kg	RL µg/kg	Result. µg/kg	RL µg/kg	Result. µg/kg	RL µg/kg	Result. µg/kg	RL µg/kg	Result. µg/kg	RL µg/kg
Aroclor 1016	U	44.3	U	44.3	U	46.3	U	43.0	U	42.5
Aroclor 1221	U	88.7	U	88.7	U	92.6	U	85.9	U	85.0
Aroclor 1232	U	44.3	U	44.3	U	46.3	U	43.0	U	42.5
Aroclor 1242	U	44.3	U	44.3	U	46.3	U	43.0	U	42.5
Aroclor 1248	U	44.3	U	44.3	U	46.3	U	43.0	U	42.5
Aroclor 1254	U	44.3	U	44.3	U	46.3	U	43.0	U	42.5
Aroclor 1260	U	44.3	U	44.3	U	46.3	U	43.0	U	42.5
Aroclor 1268	U	44.3	U	44.3	U	46.3	U	43.0	U	42.5

Table 1.1 (cont) Results of the Analysis for PCBs in Soil
WA# 0-292 Tidewater Bailing Site Ball Field
Results Based on Dry Weight

Method REAC SOP 1801

Page 2 of 3

Sample Number	42666		42678		42688		42687		42686	
Location	7P		1SB		5P		4P		4D	
Percent Solids	94		89		95		95		96	
Analyte	Result. µg/kg	RL µg/kg	Result. µg/kg	RL µg/kg	Result. µg/kg	RL µg/kg	Result. µg/kg	RL µg/kg	Result. µg/kg	RL µg/kg
Aroclor 1016	U	44.3	U	46.8	U	43.9	U	43.9	U	43.4
Aroclor 1221	U	88.7	U	93.6	U	87.7	U	87.7	U	86.8
Aroclor 1232	U	44.3	U	46.8	U	43.9	U	43.9	U	43.4
Aroclor 1242	U	44.3	U	46.8	U	43.9	U	43.9	U	43.4
Aroclor 1248	U	44.3	U	46.8	U	43.9	U	43.9	U	43.4
Aroclor 1254	U	44.3	U	46.8	U	43.9	U	43.9	U	43.4
Aroclor 1260	26.6	44.3	U	46.8	U	43.9	U	43.9	U	43.4
Aroclor 1268	U	44.3	U	46.8	U	43.9	U	43.9	U	43.4

Table 1.1 (cont) Results of the Analysis for PCBs in Soil
WA# 0-292 Tidewater Bailing Site Ball Field
Results Based on Dry Weight

Method REAC SOP 1801

Sample Number	42685		42679		42677		42676		42675	
Location	3D		2SB		2FB		1FB		2HP	
Percent Solids	98		87		94		94		90	
Analyte	Result. µg/kg	RL µg/kg	Result. µg/kg	RL µg/kg	Result. µg/kg	RL µg/kg	Result. µg/kg	RL µg/kg	Result. µg/kg	RL µg/kg
Aroclor 1016	U	42.5	U	47.9	U	44.3	U	44.3	U	46.3
Aroclor 1221	U	85.0	U	95.8	U	88.7	U	88.7	U	92.6
Aroclor 1232	U	42.5	U	47.9	U	44.3	U	44.3	U	46.3
Aroclor 1242	U	42.5	U	47.9	U	44.3	U	44.3	U	46.3
Aroclor 1248	U	42.5	U	47.9	U	44.3	U	44.3	U	46.3
Aroclor 1254	U	42.5	U	47.9	U	44.3	U	44.3	U	46.3
Aroclor 1260	U	42.5	U	47.9	U	44.3	U	44.3	U	46.3
Aroclor 1268	U	42.5	U	47.9	U	44.3	U	44.3	U	46.3

Table 1.1 (cont) Results of the Analysis for PCBs in Soil
WA# 0-292 Tidewater Bailing Site Ball Field

Method REAC SOP 1801

Page 3 of 3

Sample Number	SBLK111607	42660	1923*
Location	-	21-T	-
Percent Solids	100	100	100

Analyte	Result. µg/kg	RL µg/kg	Result. µg/kg	RL µg/kg	Result. µg/kg	RL µg/kg
Aroclor 1016	U	41.7	23.1 J	41.7	26.4 J	41.7
Aroclor 1221	U	83.3	U J	83.3	U J	83.3
Aroclor 1232	U	41.7	U J	41.7	U J	41.7
Aroclor 1242	U	41.7	U J	41.7	U J	41.7
Aroclor 1248	U	41.7	U J	41.7	U J	41.7
Aroclor 1254	U	41.7	U J	41.7	U J	41.7
Aroclor 1260	U	41.7	22.4 J	41.7	59.0 J	41.7
Aroclor 1268	U	41.7	U J	41.7	U J	41.7

* Sample 1923 is a composite of samples 42680 and 42684.

Table 1.2 Results of the Analysis for Lead in Dust
 WA # 0-292 Tidewater Bailing Site Ball Field
 Results Are Based on Sample As Received

Method REAC SOP 1811

Page 1 of 1

Analyte		Lead	
Sample No.	Location	Result mg/kg	RL mg/kg
Method Blank-11/06/07	Lab	U	1.00
42657	17-T	1410	1.25
42658	19-T	1130	1.11
42659	16-T	2290	1.00
42660	21-T	230	1.00
42661	7-T	1340	1.00

Table 1.3 Results of the Analysis for Lead in Soil
 WA # 0-292 Tidewater Bailing Site Ball Field
 Results Are Based on Dry Weight

Method REAC SOP 1811

Page 1 of 1

Analyte			Lead	
Sample No.	Location	% Solids	Result mg/kg	RL mg/kg
Method Blank-11/05/07	Lab	NA	U	1.00
42669	2TB	95	4.18	0.966
42665	6P	96	22.3 J-	0.947
42673	2PM	91	5.38	0.999
42672	1PM	92	5.24	1.03
42671	1TB	94	8.22	0.976
42670	2TBD	94	4.10	0.967
42674	1HP	90	6.58	0.966
42668	2D	97	12.0 J-	0.982
42667	1D	98	14.0 J-	0.972
42666	7P	94	29.7 J-	0.994
42678	1SB	89	6.06	1.02
42688	5P	95	7.34 J-	0.957
42687	4P	95	9.80 J-	0.966
42686	4D	96	15.3 J-	0.974
42685	3D	98	8.87 J-	0.972
42679	2SB	87	10.5	1.03
42677	2FB	94	6.13	0.976
42676	1FB	94	13.0	0.967
42675	2HP	90	6.68	0.975

Table 1.4 Results of the Analysis for Lead in Mat and Residue
WA # 0-292 Tidewater Bailing Site Ball Field
Results Based on Sample As Received

Method REAC SOP 1811

Page 1 of 1

Analyte		Lead		
Sample No.	Location	Matrix Type	Result mg/kg	RL mg/kg
Method Blank 111207	Lab	NA	U	1.00
42699	7TB	Mat 1	3.55	3.45
42693	16TB	Mat 1	16.3	3.33
42693dup	16TB	Mat 1	14.8	3.33
42690	17TC	Mat 1	7.06	3.57
42682	19TB	Mat 1	5.97	3.03
42696	21TB	Mat 1	14.2	3.13
42700	7TC	Mat 2	25.1	3.33
42694	16TC	Mat 2	5.09	3.45
42691	17TD	Mat 2	U	3.13
42681	19TC	Mat 2	4.51	3.03
42697	21TC	Mat 2	4.76	3.23
42684	17TA	Residue	196 J+	2.00
42680	19TD	Residue	270 J+	1.64

Table 1.5 Results of the Analysis for Lead in Turf and Fibers
 WA # 0-292 Tidewater Bailing Site Ball Field
 Results Based on Sample As Received

Method REAC SOP 1811

Page 1 of 1

Analyte		Turf-Whole piece Lead		Turf (Fibers only) Lead	
Sample No.	Location	Result mg/kg	RL mg/kg	Result mg/kg	RL mg/kg
Method Blank	Lab	U	1.00	U	1.00
42683	19TA	3940	4.00	4850	5.56
42689	17TB	3990	3.33	4580	3.85
42692	16TA	4020	4.35	4950	5.56
42695	21TA	3960	4.55	4900	5.88
42698	7TA	3730	3.45	4920	5.26

Table 2.1 Results of the MS/MSD Analysis for PCBs in Soil
 WA#0-292 Tidewater Bailing Site Ball Field
 Results Are Based on Dry Weight

Page 1 of 1

Sample ID: 42672

Analyte	Sample Conc µg/kg	MS/MSD		MS % Recovery	MSD Conc µg/kg	MSD % Recovery	RPD
		Spike Added µg/kg	MS Conc µg/kg				
Aroclor 1016	U	181	138	76	131	72	5
Aroclor 1260	U	181	204	113	208	115	2

Sample ID: 42666

Analyte	Sample Conc µg/kg	MS/MSD		MS % Recovery	MSD Conc µg/kg	MSD % Recovery	RPD
		Spike Added µg/kg	MS Conc µg/kg				
Aroclor 1016	U	177	180	102	222	125	21
Aroclor 1260	26.6	177	256	129	228	114	12

Table 2.2 Results of the MS/MSD Analysis for Lead in Dust
 WA#0-292 Tidewater Bailing Site Ball Field
 Results Are Based on Sample As Received

Page1 of 1

Sample No. 42660

Analyte	Sample Result mg/kg	MS/MSD Spike Added mg/kg	MS Result mg/kg	MS % Recovery	MSD Result mg/kg	MSD % Recovery	RPD	Recommended QC Limits % Recovery	RPD
Lead	230	40.0	285	NC	281	NC	NC	75-125	20

Table 2.3 Results of the MS/MSD Analysis for Lead in Soil
 WA#0-292 Tidewater Bailing Site Ball Field
 Results Are Based on Dry Weight

Page 1 of 1

Sample No. 42672

Analyte	Sample Result mg/kg	MS/MSD Spike Added mg/kg	MS Result mg/kg	MS % Recovery	MSD Result mg/kg	MSD % Recovery	RPD	Recommended QC Limits % Recovery	RPD
Lead	5.24	41.4	45.3	97	45.5	97	0	75-125	20

Sample No. 42666

Analyte	Sample Result mg/kg	MS/MSD Spike Added mg/kg	MS Result mg/kg	MS % Recovery	MSD Result mg/kg	MSD % Recovery	RPD	Recommended QC Limits %Rec	RPD
Lead	29.7	39.8	59.2	74 *	61.2	79	3	75-125	20

Table 2.4 Results of the MS/MSD Analysis for Lead in Mat
 WA#0-292 Tidewater Bailing Site Ball Field
 Results Based on Sample As Received

Page 1 of 1

Sample No. 42694

Analyte	Sample Result mg/kg	MS Spike Added mg/kg	MS Result mg/kg	MS % Recovery	MSD Spike Added mg/kg	MSD Result mg/kg	MSD % Recovery	RPD	Recommended QC Limits	
									% Recovery	RPD
Lead	5.09	138	137	96	133	136	98	1	75-125	20

Table 2.5 Results of the MS/MSD Analysis for Lead in Residue
 WA # 0-292 Tidewater Bailing Site Ball Field
 Results Based on Sample As Received

Page 1 of 1

Sample No. 42684

Analyte	Sample Result mg/kg	MS/MSD Spike Added mg/kg	MS Result mg/kg	MS		MSD Result mg/kg	MSD		Recommended	
				%	Recovery		%	Recovery	RPD	QC Limits %Rec RPD
Lead	196	80.0	312	145	*	306	138	*	2	75-125 20

Table 2.6 Results of the MS/MSD Analysis for Lead in Turf
WA#0-292 Tidewater Bailing Site Ball Field
Results Based on Sample As Received

Page 1 of 1

Sample No. 42695 (Turf whole piece)

Analyte	Sample Result mg/kg	MS Spike Added mg/kg	MS Result mg/kg	MS % Recovery	MSD Spike Added mg/kg	MSD Result mg/kg	MSD % Recovery	RPD	Recommended QC Limits % Recovery	RPD
Lead	3960	160	4020	NC	148	3780	NC	6	75-125	20

Table 2.7 Results of the MS/MSD Analysis for Lead in Turf Fibers
 WA#0-292 Tidewater Bailing Site Ball Field
 Results Based on Sample As Received

Sample No. 42695(Fibers)

Page 1 of 1

Analyte	Sample Result mg/kg	MS/MSD Spike Added mg/kg	MS Result mg/kg	MS % Recovery	MSD Result mg/kg	MSD % Recovery	RPD	Recommended QC Limits	
								% Recovery	RPD
Lead	4900	200	5110	NC	5250	NC	3	75-125	20

Table 2.8 Results of the LCS Analysis for PCBs in Soil
WA#0-292 Tidewater Bailing Site Ball Field

Page 1 of 1

LCS standard: SLCS-PS60
Date Analyzed: 11/6/07

Analyte	LCS Spike Added µg/kg	LCS Conc µg/kg	LCS % Recovery	Advisory QC Limits % Recovery
Aroclor 1016	167	159	95	70-130
Aroclor 1260	167	188	113	70-130

LCS standard: LCS/LCSD111608
Date Analyzed: 11/17/07

Analyte	LCS Spike Added µg/kg	LCS Conc µg/kg	LCS % Recovery	LCSD Conc µg/kg	LCSD % Recovery	RPD	Advisory QC Limits	
							RPD	% Recovery
Aroclor 1016	167	129	77	137	82	6	20	70-130
Aroclor 1260	167	159	95	172	103	8	20	70-130

Table 2.9 Results of the LCS Analysis for Lead in Dust
WA#0-292 Tidewater Bailing Site Ball Field

Page 1 of 1

LCS Standard: ERA Lot No. D056-540-11/06/07
Date Analyzed: 11/6/2007

Analyte	Conc. Recovered mg/kg	Certified Value mg/kg	PALs mg/kg	% Recovery
Lead	69.3	72.2	59.1 - 85.4	96

PAL - Performance Acceptance Limits

Table 2.10 Results of the LCS Analysis for Lead in Soil
WA#0-292 Tidewater Bailing Site Ball Field

Page 1 of 1

LCS Standard: ERA Lot No. D056-540-11/05/07
Date Analyzed: 11/5/2007

Analyte	Conc. Recovered mg/kg	Certified Value mg/kg	PALs mg/kg	% Recovery
Lead	67.7	72.2	59.1 - 85.4	94

PAL - Performance Acceptance Limits

LCS Standard: ERA Lot No. D056-540-11/13/07
Date Analyzed: 11/13/2007

Analyte	Conc. Recovered mg/kg	Certified Value mg/kg	PALs mg/kg	% Recovery
Lead	64.1	72.2	59.1 - 85.4	89

PAL - Performance Acceptance Limits

Table 2.11 Results of the LCS/LCSD Analysis for Lead in Turf and Fibers
WA#0-292 Tidewater Bailing Site Ball Field

LCS Standard: ERA Lot No. D056-540-111407
Date Analyzed: 11/15/2007

Analyte	Certified Value mg/kg	LCS Conc mg/kg	LCS % Recovery	LCSD Conc mg/kg	LCSD % Recovery	RPD	QC Limit RPD	PALs mg/kg
Lead	72.2	69.1	96	67.6	94	2	20	59.1-85.4

Table 2.12 Results of the Duplicate Analysis for Lead in Turf and Fibers
 WA#0-292 Tidewater Bailing Site Ball Field
 Results Based on Sample As Received

Sample 42689

Section	Initial Analysis mg/kg	Duplicate Analysis mg/kg	RPD	QC Limits RPD
Whole Turf piece	3990	3860	3	20
Fibers only	4580	4330	6	20

0292-DAR-11260707 EP-C-04-032

CHAIN OF CUSTODY RECORD

No: 292-11/02/07-0002

Site #: 292

Contact Name: D Killeen

Contact Phone: X4245

Lab #	Sample #	Location	Matrix	Collected	Numb Cont	Container	Preservative	Analyses	MS/MSD
15365	42669	2TB	Soil	11/1/2007	1	8 oz cwm	4 degrees C	Lead (Pb)	N
15366	42665	6P	Soil	11/1/2007	1	8 oz cwm	4 degrees C	PCBs	N
15367	42673	2PM	Soil	11/1/2007	1	8 oz cwm	4 degrees C	Lead (Pb)	N
15368	42672	1PM	Soil	11/1/2007	2	8 oz cwm	4 degrees C	PCBs	Y
↓	42672	1PM	Soil	11/1/2007	2	8 oz cwm	4 degrees C	Lead (Pb)	Y
15369	42671	1TB	Soil	11/1/2007	1	8 oz cwm	4 degrees C	PCBs	N
↓	42671	1TB	Soil	11/1/2007	1	8 oz cwm	4 degrees C	Lead (Pb)	N
15370	42670	2TBD	Soil	11/1/2007	1	8 oz cwm	4 degrees C	Lead (Pb)	N
15371	42674	1HP	Soil	11/1/2007	1	8 oz cwm	4 degrees C	PCBs	N
15365	42669	2TB	Soil	11/1/2007	1	8 oz cwm	4 degrees C	PCBs	N
15371	42674	1HP	Soil	11/1/2007	1	8 oz cwm	4 degrees C	Lead (Pb)	N
15372	42668	2D	Soil	11/1/2007	1	8 oz cwm	4 degrees C	PCBs	N
↓	42668	2D	Soil	11/1/2007	1	8 oz cwm	4 degrees C	Lead (Pb)	N
15373	42667	1D	Soil	11/1/2007	1	8 oz cwm	4 degrees C	PCBs	N
↓	42667	1D	Soil	11/1/2007	1	8 oz cwm	4 degrees C	Lead (Pb)	N
15374	42666	7P	Soil	11/1/2007	2	8 oz cwm	4 degrees C	PCBs	Y
↓	42666	7P	Soil	11/1/2007	2	8 oz cwm	4 degrees C	Lead (Pb)	Y
15366	42665	6P	Soil	11/1/2007	1	8 oz cwm	4 degrees C	Lead (Pb)	N
15370	42670	2TBD	Soil	11/1/2007	1	8 oz cwm	4 degrees C	PCBs	N

Special Instructions: Pb prelims due in 2-3 days, PCB prelims in 5 days

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
all analysis	D Killeen	11/5/07	Jerry Martin	11/5/07	8:00	10/Analysis	Jerry Martin	11/5/07	J. Patel	11/05/07	8:45 AM
10/transfer to organ	J. Patel	11/05/07	Jerry Martin	11/5/07	10:10	All Analysis	Jerry Martin	11/5/07	J. Patel	11/05/07	11:30 AM

Samples received 4°C 7m 11/5/07

No: 292-11/02/07-0002

Contact Phone: X4245

024

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
All / Analysis	Theresa Keller	11/5/07	Young Martin	11/5/07	8:00	All / Analysis ^{Metals}	Young Martin	11/5/07	Jon Patel	11/05/07	8:45 AM
All / Other Analysis	Jon Patel	11/5/07	Young Martin	11/5/07	10:10	All / Analysis ^{PCB}	Young Martin	11/5/07	Jon Patel	11/5/07	11:30 AM

EP-C-04-032

0292-DAR-11260707

CHAIN OF CUSTODY RECORD

Site #: 292

Contact Name: Deborah Killeen

Contact Phone: 732-321-4245

No: 292-11/02/07-0003

Lab: REAC

Lab Phone: 732-321-4252

Lab #	Sample #	Location	Matrix	Collected	Numb Cont	Container	Preservative	Analyses	MS/MSD
15419	42680	19TD	Residue	11/1/2007	1	8 oz cwm	None	Lead (Pb)	N
15420	42681	19TC	Mat 2	11/1/2007	1	Ziploc Bag	None	Lead (Pb)	N
15421	42682	19TB	Mat 1	11/1/2007	1	Ziploc Bag	None	Lead (Pb)	N
15422	42683	19TA	Turf	11/1/2007	1	Ziploc Bag	None	Lead (Pb)	N
15423	42684	17TA	Residue	11/1/2007	1	8 oz cwm	None	Lead (Pb)	N
15424	42689	17TB	Turf	11/1/2007	1	Ziploc Bag	None	Lead (Pb)	N
15425	42690	17TC	Mat 1	11/1/2007	1	Ziploc Bag	None	Lead (Pb)	N
15426	42691	17TD	Mat 2	11/1/2007	1	Ziploc Bag	None	Lead (Pb)	N
15427	42692	16TA	Turf	11/1/2007	1	Ziploc Bag	None	Lead (Pb)	N
15428	42693	16TB	Mat 1	11/1/2007	1	Ziploc Bag	None	Lead (Pb)	N
15429	42694	16TC	Residue	11/1/2007	1	8 oz cwm Ziploc Bag	None	Lead (Pb)	N
15430	42695	21TA	Turf	11/1/2007	1	Ziploc Bag	None	Lead (Pb)	N
15431	42696	21TB	Mat 1	11/1/2007	1	Ziploc Bag	None	Lead (Pb)	N
15432	42697	21TC	Mat 2	11/1/2007	1	Ziploc Bag	None	Lead (Pb)	N
15433	42698	7TA	Turf	11/1/2007	1	Ziploc Bag	None	Lead (Pb)	N
15434	42699	7TB	Mat 1	11/1/2007	1	Ziploc Bag	None	Lead (Pb)	N
15435	42700	7TC	Mat 2	11/1/2007	1	Ziploc bag	None	Lead (Pb)	N

Special Instructions: Prep samples as discussed during teleconference with ERT WAM.

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
All / Analysis	Deborah Killeen	11/6/07	Jenny Martin	11/6/07	8:10	All / Analysis	Jenny Martin	11/8/07	ATB	11/8/07	8:00
All / Storages	ATB	11/15/07	Jenny Martin	11/15/07	9:30						

0292-DAR-11260707

026

CHAIN OF CUSTODY RECORD

Site #: 292

Contact Name: Deborah Killeen

Contact Phone: 732-321-4245

No: 292-11/06/07-0004

Lab: REAC

Lab Phone: 732-321-4252

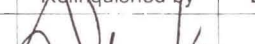
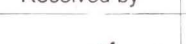
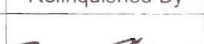
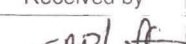
[illegible]

Special Instructions: Use sample 21-T for the MS/MSD

SAMPLES TRANSFERRED FROM		TO	
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32
33	34	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50	51	52
53	54	55	56
57	58	59	60
61	62	63	64
65	66	67	68
69	70	71	72
73	74	75	76
77	78	79	80
81	82	83	84
85	86	87	88
89	90	91	92
93	94	95	96
97	98	99	100

CHAIN OF CUSTODY #

IN OF CUSTODY #
QC 80. 11/6/07

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time
all analysis		11/6/07		11/6/07	8:10	All / Analysis		11/6/07		11/6/07	8:30

CHAIN OF CUSTODY RECORD

Project Name: Tideview 'r
Project Number: EAC0292
LM Contact: Vinod Kansal Phone: 732-321-4252
Deborah Killeen (Task Leader) 732-321-4245

No: **40591**
Sheet **01** of **01** (Do not copy)
(for addnl. samples use new form)

Sample Identification

Analyses Requested

REAC#	Sample No	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	PCBs				
15417	42660	21-T	S	11/1/07	1	8oz Jar / None	✓				
15427	1923 *	N/A	↓	↓	↓	↓	✓				
X											

11/14/07

11/14/07

0292-DA-112607

027

Matrix:

Special Instructions:

- A- Air
- AT-Animal Tissue
- DL- Drum Liquids
- DS- Drum Solids
- GW- Groundwater
- O- Oil
- PR-Product
- PT-Plant Tissue
- PW- Potable Water
- S- Soil
- SD- Sediment
- SL- Sludge
- SW- Surface Water
- TX-TCLP Extract
- W- Water
- X- Other

* Sample is a composite of samples 15419 and 15423 on COC# 292-110207-0003. 15g of each sample was homogenized to make a 30g composite sample.

** Reac #'s are not chronological

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #:
15417 → COC# 292-110607-0004
COC# 292-110207-0003

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished by	Date	Received by	Date	Time
All Analysis	Johnny Morris	11/14/07	[Signature]	11/14/07	16:00						